

- 1 1. A diversity receiver system for receiving coded data modulated signal from
2 a transmission channel, said transmission channel characterized by
3 multiple transmission paths having variable transmission time and variable
4 attenuation characteristics causing multiple copies of said coded data
5 modulated signal, wherein said diversity receiver system comprises:

6 a signal acquisition device in communication with the transmission
7 channel for reception of said multiple copies of said coded data
8 modulated signal, for evaluation of signal characteristics of one
9 or more copies of said multiple copies of said coded data
10 modulated signal, for extraction coded data, control signals, and
11 locking signals from the one or more copies of said multiple
12 copies of said coded data;

13 a diversity circuit in communication with the signal acquisition
14 device to receive said signal characteristics and said coded
15 data, said control signals, and locking signals, said diversity
16 circuit selecting from said signal characteristics, said control
17 signals, and said locking signals, one of said copies of said
18 coded data modulated signals; and

19 an error evaluation circuit in communication with the diversity circuit
20 to receive the coded data from the selected copy of the coded
21 data modulated signal, said error evaluation circuit evaluating
22 said coded data signal for errors and providing an error signal to

23 said diversity circuit indicating an error state of said selected
24 data, wherein said diversity circuit selects a second copy of said
25 coded data modulated signal.

1 2. The diversity receiver system of claim 1 wherein the signal acquisition
2 device comprises:

3 a plurality of receiving transducers in communication with said
4 transmission channel, each transducer acquiring one of said
5 copies of the coded data modulated signal from said
6 transmission channel and converting said copy of the coded
7 data modulated signal to a received electrical signal, said
8 received electrical signal varying in magnitude dependant upon
9 the transmission time and variable attenuation characteristics of
10 said transmission channel; and

11 a plurality of receivers, each receiver in communication with one of
12 said receiving transducers to amplify and condition said
13 electrical signal and to extract said coded data, control signals,
14 and locking signals from said received electrical signal.

1 3. The diversity receiver system of claim 2 wherein each of the plurality of
2 the receiving transducers are assigned a selection priority such that the
3 receiver in communication with a receiving transducer of a highest priority
4 is selected by said diversity circuit.

- 1 4. The diversity receiver system of claim 2 wherein if said error signal
2 indicates said selected data is in error, the diversity circuit determines
3 another receiver having a valid locking signal and transfers the data of
4 said receiver to the error evaluation circuit.

- 1 5. The diversity receiver system of claim 2 wherein if the error evaluation
2 circuit indicates said selected data is in error but is correctable, said error
3 evaluation circuit corrects said selected data.

- 1 6. The diversity receiver system of claim 2 further comprising a data register
2 in communication with said diversity circuit to retain said selected data and
3 in communication with the error evaluation circuit so that said error
4 evaluation circuit can retrieve said selected data.

- 1 7. The diversity receiver system of claim 2 further comprising a de-
2 interleaving circuit in communication with the diversity circuit to organize
3 said selected data such that said selected data is in a contiguous order
4 prior to transfer to said error evaluation circuit.

- 1 8. The diversity receiver system of claim 1 wherein the signal acquisition
2 device comprises:

3 a plurality of receiving transducers in communication with said
4 transmission channel, each transducer acquiring one of said
5 copies of the coded data modulated signal from said
6 transmission channel and converting said copy of the coded

7 data modulated signal to a received electrical signal, said
8 received electrical signal varying in magnitude dependant upon
9 the transmission time and variable attenuation characteristics of
10 said transmission channel;

11 an transducer switch in communication with the plurality of
12 receiving transducers and in communication with the diversity
13 circuit, which upon reception of a transducer selection signal
14 from said diversity circuit selects one of said the electrical
15 signals of a selected receiving transducer; and

16 a receiver in communication with the transducer switch to amplify
17 and condition said electrical signal from selected receiving
18 transducer and to extract said coded data, control signals, and
19 locking signals from said received electrical signal and in
20 communication with the error evaluation circuit to transfer said
21 coded data to the error evaluation circuit.

1 9. The diversity receiver system of claim 8 wherein each of the plurality of
2 the receiving transducers are assigned a selection priority such that the
3 receiving transducer of a highest priority is selected by said diversity
4 circuit.

1 10. The diversity receiver system of claim 8 wherein if said error signal
2 indicates said coded data received and extracted from the electrical signal

3 of the selected receiving transducer is in error, the diversity circuit
4 generates the transducer selection signal to select a second electrical
5 signal from a second receiving transducer to be transferred to the
6 receiver, said second electrical signal then having a valid locking signal
7 and transfers the data of said receiver to the error evaluation circuit.

1 11. The diversity receiver system of claim 8 wherein if the error evaluation
2 circuit indicates said coded data received and extracted from the electrical
3 signal of the selected receiving transducer is in error but is correctable,
4 said error evaluation circuit corrects said coded data received and
5 extracted from the electrical signal of the selected receiving transducer.

1 12. The diversity receiver system of claim 8 further comprising a data register
2 in communication with said diversity circuit to retain said coded data
3 received and extracted from the electrical signal of the selected receiving
4 transducer and in communication with the error evaluation circuit so that
5 said error evaluation circuit can retrieve said coded data.

1 13. The diversity receiver system of claim 7 further comprising a de-
2 interleaving circuit in communication with the diversity circuit to organize
3 said selected data such that said coded data received and extracted from
4 the electrical signal of the selected receiving transducer is in a contiguous
5 order prior to transfer to said error evaluation circuit.

- 1 14. A method for receiving coded data modulated signal from a transmission
2 channel, said transmission channel characterized by multiple transmission
3 paths having variable transmission time and variable attenuation
4 characteristics causing multiple copies of said coded data modulated
5 signal, said method for receiving the coded data modulated signal
6 comprising the steps of:
- 7 a) acquiring the multiple copies of coded data modulated signal;
- 8 b) evaluating signal characteristics of one or more copies of said
9 multiple copies of said coded data modulated signal;
- 10 c) extracting coded data, control signals, and locking signals from
11 the one or more copies of said multiple copies of said coded
12 data;
- 13 d) selecting one of said copies of said coded data modulated
14 signals from said signal characteristics, said control signals,
15 and said locking signals;
- 16 e) performing an error check and correction upon said coded data;
17 and
- 18 f) if the error check and correction is not able to correct said coded
19 data, repeating steps d) and e) until a data block is
20 successfully received.

1 15. The method of claim 14 wherein the step of extracting the coded data
2 includes the step of rearranging the coded data such that data within said
3 coded data is in contiguous order.

1 16. The method of claim 14 wherein creating the locking signal comprises the
2 steps of:

3 detecting a synchronization signal within said coded data
4 modulated signal;

5 synchronizing said receiver to said coded data modulated signal;
6 and

7 detecting the control signals indicative of a beginning of said
8 plurality of data blocks within said coded data modulated signal.

1 17. The method of claim 14 wherein each copy of the multiple copies of the
2 coded data modulated signal is assigned a selection priority such that
3 selecting one of the multiple copies of the coded data modulated signals
4 comprises the step of choosing the copy of the multiple copies of
5 modulated coded data having a highest priority.

1 18. An apparatus for receiving coded data modulated signal from a
2 transmission channel, said transmission channel characterized by multiple
3 transmission paths having variable transmission time and variable
4 attenuation characteristics causing multiple copies of said coded data

5 modulated signal, said apparatus for receiving the coded data modulated
6 signal comprising the steps of:

7 a) means for acquiring the multiple copies of coded data modulated
8 signal;

9 b) means for evaluating signal characteristics of one or more copies
10 of said multiple copies of said coded data modulated signal;

11 c) means for extracting coded data, control signals, and locking
12 signals from the one or more copies of said multiple copies
13 of said coded data;

14 d) means for selecting one of said copies of said coded data
15 modulated signals from said signal characteristics, said
16 control signals, and said locking signals;

17 e) means for performing an error check and correction upon said
18 coded data; and

19 f) means for repeatedly activating means d) and e) until a data
20 block is successfully received, if the error check and
21 correction is not able to correct said coded data.

1 19. The apparatus of claim 18 wherein the means for extracting the coded
2 data includes means for rearranging the coded data such that data within
3 said coded data is in contiguous order.

1 20. The apparatus of claim 18 wherein means for creating the locking signal
2 comprises:

3 means for detecting a synchronization signal within said coded data
4 modulated signal;

5 means for synchronizing said receiver to said coded data
6 modulated signal; and

7 means for detecting the control signals indicative of a beginning of
8 said plurality of data blocks within said coded data modulated
9 signal.

1 21. The apparatus of claim 18 wherein each copy of the multiple copies of the
2 coded data modulated signal is assigned a selection priority such that
3 means for selecting one of the multiple copies of the coded data
4 modulated signals comprises means for choosing the copy of the multiple
5 copies of modulated coded data having a highest priority.

1 22. An apparatus for receiving coded data modulated signal from a
2 transmission channel, said transmission channel characterized by multiple
3 transmission paths having variable transmission time and variable
4 attenuation characteristics causing multiple copies of said coded data
5 modulated signal, said apparatus executing a process for receiving the
6 coded data modulated signal comprising the steps of:

- 7 a) acquiring the multiple copies of coded data modulated signal;
- 8 b) evaluating signal characteristics of one or more copies of said
- 9 multiple copies of said coded data modulated signal;
- 10 c) extracting coded data, control signals, and locking signals from
- 11 the one or more copies of said multiple copies of said coded
- 12 data;
- 13 d) selecting one of said copies of said coded data modulated
- 14 signals from said signal characteristics, said control signals,
- 15 and said locking signals;
- 16 e) performing an error check and correction upon said coded data;
- 17 and
- 18 f) if the error check and correction is not able to correct said coded
- 19 data, repeating steps d) and e) until a data block is
- 20 successfully received.

1 23. The apparatus of claim 22 wherein the step of extracting the coded data

2 includes the step of rearranging the coded data such that data within said

3 coded data is in contiguous order.

1 24. The apparatus of claim 22 wherein creating the locking signal comprises

2 the steps of:

3 detecting a synchronization signal within said coded data
4 modulated signal;
5 synchronizing said receiver to said coded data modulated signal;
6 and
7 detecting the control signals indicative of a beginning of said
8 plurality of data blocks within said coded data modulated signal.

1 25. The apparatus of claim 22 wherein each copy of the multiple copies of the
2 coded data modulated signal is assigned a selection priority such that
3 selecting one of the multiple copies of the coded data modulated signals
4 comprises the step of choosing the copy of the multiple copies of
5 modulated coded data having a highest priority.

1 26. A diversity receiver system for receiving a broadcast signal modulated
2 with coded data, having multiple transmission paths, said diversity
3 receiver comprising:

4 a plurality of receiving transducers, each transducer acquiring said
5 broadcast signal and converting said broadcast signal to a
6 received electrical signal, said received electrical signal varying
7 in magnitude dependant upon an intensity of said broadcast
8 signal traversing said multiple transmission paths;

9 a plurality of receivers, each receiver in communication with one of
10 said receiving transducers to amplify and condition said
11 electrical signal and to extract data and locking signals from
12 said received electrical signal;

13 a diversity circuit in communication with each of the plurality of
14 receivers to receive said data and locking signals, said diversity
15 circuit selecting one of the data signals from one of the plurality
16 of receivers having a valid locking signal indicating said receiver
17 is able to retrieve said coded data from the electrical signal; and

18 an error evaluation circuit in communication with the diversity circuit
19 to receive the selected data signal, said error evaluation circuit
20 evaluating said selected data signal for errors and providing an
21 error signal to said diversity circuit indicating an error state of
22 said selected data.

1 27. The diversity receiver system of claim 26 wherein if said error signal
2 indicates said selected data is in error, the diversity circuit determines
3 another receiver having a valid locking signal and transfers the data of
4 said receiver to the error evaluation circuit.

1 28. The diversity receiver system of claim 26 wherein if the error evaluation
2 circuit indicates said selected data is in error but is correctable, said error
3 evaluation circuit corrects said selected data.

1 29. The diversity receiver system of claim 126 further comprising a data
2 register in communication with said diversity circuit to retain said selected
3 data and in communication with the error evaluation circuit so that said
4 error evaluation circuit can retrieve said selected data.

1 30. The diversity receiver system of claim 26 further comprising a de-
2 interleaving circuit in communication with the diversity circuit to organize
3 said selected data such that said selected data is in a contiguous order
4 prior to transfer to said error evaluation circuit.

1 31. A method for receiving a broadcast signal modulated with coded data
2 comprising the steps of:

- 3 a) acquiring said broadcast signal at one of a plurality of receivers;
- 4 b) creating a locking signal indicating said receiver has successfully
5 acquired said broadcast signal;
- 6 c) if said locking signal is able to be created, repeating steps a) and
7 b) until a locking signal is created indicating successful
8 acquisition of said broadcast signal;
- 9 d) extracting one data block of a plurality of data blocks of said
10 coded data from said broadcast signal;
- 11 e) performing an error check and correction upon said data block
12 for eliminating errors from said data block;

13 f) if the error check and correction is not able to correct said data

14 block, repeating steps a) through e) until a data block is

15 successfully received; and

16 g) repeatedly performing said error check and correction until all

17 remaining data blocks of said broadcast signal are extracted

18 and successfully checked and corrected for errors.

1 32. The method of claim 31 wherein the step of extracting the data block

2 includes the step of rearranging the data block such that data within said

3 data block is in contiguous order.

1 33. The method of claim 31 wherein creating the locking signal comprises the

2 steps of:

3 detecting a synchronization signal within said broadcast signal;

4 synchronizing said receiver to said broadcast signal; and

5 detecting a start signal indicative of a beginning of said plurality of

6 data blocks within said broadcast signal.

1 34. An apparatus for receiving a broadcast signal modulated with coded data

2 comprising:

3 a) means for acquiring said broadcast signal at one of a plurality of

4 receivers;

- 5 b) means for creating a locking signal indicating said receiver has
6 successfully acquired said broadcast signal;
- 7 c) means for activating the means of a) and b) until a locking signal
8 is created indicating successful acquisition of said broadcast
9 signal, if said locking signal is able to be created,;
- 10 d) means for extracting one data block of a plurality of data blocks
11 from said broadcast signal;
- 12 e) means for performing an error check and correction upon said
13 data block for eliminating errors from said data block;
- 14 f) means for activating the means of a) through e) until a data block
15 is successfully received, if the error check and correction is
16 not able to correct said data block; and
- 17 g) means for repeatedly performing said error check and correction
18 until all remaining data blocks of said broadcast signal are
19 extracted and successfully checked and corrected for errors.

1 35. The apparatus of claim 34 wherein the means for extracting the data block
2 includes means for rearranging the data block such that data within said
3 data block is in contiguous order.

1 36. The apparatus of claim 34 wherein means for creating the locking signal
2 comprises:

3 means for detecting a synchronization signal within said broadcast
4 signal;

5 means for synchronizing said receiver to said broadcast signal; and

6 means for detecting a start signal indicative of a beginning of said
7 plurality of data blocks within said broadcast signal.

1 37. An apparatus for acquiring coded data from a plurality of receivers, each
2 receiver in communication with one of a plurality receiving transducers to
3 amplify and condition an electrical signal acquired by said receiving
4 transducers and extract said coded data and locking signals from said
5 received electrical signal, each receiving transducer acquiring a broadcast
6 signal and converting said broadcast signal to said received electrical
7 signal, said received electrical signal varying in magnitude dependant
8 upon an intensity of said broadcast signal, said digital signal processing
9 system executing a program comprising the steps of:

10 a) selecting one of said plurality of receivers;

11 b) detecting said locking signal indicating said receiver has
12 successfully acquired said broadcast signal;

13 c) if said locking signal is not able to be created by said, repeating
14 steps a) and b) until a locking signal is created indicating
15 successful acquisition of said broadcast signal;

16 d) extracting one data block of a plurality of data blocks of said
17 coded data from said electrical signal;
18 e) performing an error check and correction upon said data block
19 for eliminating errors from said data block;
20 f) if the error check and correction is not able to correct said data
21 block, repeating steps a) through e) until a data block is
22 successfully received; and
23 g) repeatedly performing said error check and correction until all
24 remaining data blocks of said electrical signal are extracted
25 and successfully checked and corrected for errors.

1 38. The apparatus of claim 37 wherein the step of extracting the data block
2 includes the step of rearranging the data block such that data within said
3 data block is in contiguous order.

1 39. The apparatus of claim 37 wherein creating the locking signal comprises
2 the steps of:

3 detecting a synchronization signal within said broadcast signal;
4 synchronizing said receiver to said broadcast signal; and
5 detecting a start signal indicative of a beginning of said plurality of
6 data blocks within said broadcast signal.

1 40. A diversity receiver system for receiving coded data modulated signal from
2 a transmission channel, said transmission channel characterized by
3 multiple transmission paths having variable transmission time and variable
4 attenuation characteristics causing multiple copies of said coded data
5 modulated signal, wherein said diversity receiver system comprises:

6 a plurality of receiving transducers in communication with said
7 transmission channel, each transducer acquiring one of said
8 copies of the coded data modulated signal from said
9 transmission channel and converting said copy of the coded
10 data modulated signal to a received electrical signal, said
11 received electrical signal varying in magnitude dependant upon
12 the transmission time and variable attenuation characteristics of
13 said transmission channel;

14 a transducer switch in communication with the plurality of receiving
15 transducers, which upon reception of a transducer selection
16 signal selects one of said the electrical signals of a selected
17 receiving transducer;

18 a receiver in communication with the transducer switch to amplify
19 and condition said electrical signal from a selected receiving
20 transducer and to extract said coded data, control signals, and
21 locking signals from said received electrical signal.

22 a diversity circuit in communication with the receiver to receive said
23 signal characteristics and said coded data, said control signals,
24 and locking signals, and in communication with the transducer
25 switch, said diversity circuit selecting from said signal
26 characteristics, said control signals, and said locking signals,
27 generates the transducer selection signal designating one of
28 said copies of said coded data modulated signals; and

29 an error evaluation circuit in communication with the receiver to
30 receive the coded data from the selected copy of the coded data
31 modulated signal, said error evaluation circuit evaluating said
32 coded data signal for errors and providing an error signal to said
33 diversity circuit indicating an error state of said selected data,
34 wherein said diversity circuit generates a second transducer
35 selection signal to select a second copy of said coded data
36 modulated signal.

1 41. The diversity receiver system of claim 40 wherein each of the plurality of
2 the receiving transducers are assigned a selection priority such that the
3 receiving transducer of a highest priority is selected by said diversity
4 circuit.

1 42. The diversity receiver system of claim 40 wherein if said error signal
2 indicates said coded data received and extracted from the electrical signal
3 of the selected receiving transducer is in error, the diversity circuit

4 generates the transducer selection signal to select a second electrical
5 signal from a second receiving transducer to be transferred to the
6 receiver, said second electrical signal then having a valid locking signal
7 and transfers the data of said receiver to the error evaluation circuit.

1 43. The diversity receiver system of claim 40 wherein if the error evaluation
2 circuit indicates said coded data received and extracted from the electrical
3 signal of the selected receiving transducer is in error but is correctable,
4 said error evaluation circuit corrects said coded data received and
5 extracted from the electrical signal of the selected receiving transducer.

1 44. The diversity receiver system of claim 40 further comprising a data
2 register in communication with said diversity circuit to retain said coded
3 data received and extracted from the electrical signal of the selected
4 receiving transducer and in communication with the error evaluation circuit
5 so that said error evaluation circuit can retrieve said coded data.

1 45. The diversity receiver system of claim 40 further comprising a de-
2 interleaving circuit in communication with the diversity circuit to organize
3 said selected data such that said coded data received and extracted from
4 the electrical signal of the selected receiving transducer is in a contiguous
5 order prior to transfer to said error evaluation circuit.

1 46. A method for receiving coded data modulated signal from a transmission
2 channel, said transmission channel characterized by multiple transmission

3 paths having variable transmission time and variable attenuation
4 characteristics causing multiple copies of said coded data modulated
5 signal, said method for receiving the coded data modulated signal
6 comprising the steps of:

- 7 a) setting a priority value for each of a plurality of receiving
8 transducers, said plurality of receiving transducers in
9 communication with the transmission channel such that said
10 receiving transducers convert one of the copies of the coded
11 data modulated signal to a received electrical signal;
- 12 b) selecting one of the plurality of receiving transducers having a
13 highest priority;
- 14 c) evaluating signal characteristics of said received electrical signal
15 from the one receiving transducer having the highest priority;
- 16 d) extracting coded data, control signals, and locking signals from
17 the received electrical signal from the one receiving
18 transducer having the highest priority;
- 19 e) performing an error check and correction upon said coded data;
- 20 f) if the signal characteristics, control signals, locking signals, and
21 results of said error check and correction indicate that the
22 received electrical signal is not adequate for reconstruction

23 of coded data from said received electrical signal, adjusting
24 said priority value of said receiving transducer to a lower
25 priority; and

26 g) repeating steps d) through f) until said coded data is successfully
27 received.

1 47. The method of claim 46 wherein the step of extracting the coded data
2 includes the step of rearranging the coded data such that data within said
3 coded data is in contiguous order.

1 48. The method of claim 46 wherein extracting the control signals and the
2 locking signal comprises the steps of:

3 detecting a synchronization signal within said coded data
4 modulated signal;

5 synchronizing said receiver to said coded data modulated signal;
6 and

7 detecting the control signals indicative of a beginning of said
8 plurality of data blocks within said coded data modulated signal.

1 49. An apparatus for receiving coded data modulated signal from a
2 transmission channel, said transmission channel characterized by multiple
3 transmission paths having variable transmission time and variable
4 attenuation characteristics causing multiple copies of said coded data

5 modulated signal, said apparatus for receiving the coded data modulated
6 signal comprising:

7 a) means for setting a priority value for each of a plurality of
8 receiving transducers, said plurality of receiving transducers
9 in communication with the transmission channel such that
10 said receiving transducers convert one of the copies of the
11 coded data modulated signal to a received electrical signal;

12 b) means for selecting one of the plurality of receiving transducers
13 having a highest priority;

14 c) means for evaluating signal characteristics of said received
15 electrical signal from the one receiving transducer having the
16 highest priority;

17 d) means for extracting coded data, control signals, and locking
18 signals from the received electrical signal from the one
19 receiving transducer having the highest priority;

20 e) means for performing an error check and correction upon said
21 coded data;

22 f) means for adjusting said priority value of said receiving
23 transducer to a lower priority, if the signal characteristics,
24 control signals, locking signals, and results of said error

25 check and correction indicate that the received electrical
26 signal is not adequate for reconstruction of coded data from
27 said received electrical signal; and

28 g) means for repeatedly activating means of d) through f) until said
29 coded data is successfully received.

1 50. The apparatus of claim 49 wherein the means for extracting the coded
2 data includes the step of rearranging the coded data such that data within
3 said coded data is in contiguous order.

1 51. The apparatus of claim 49 wherein means for extracting the control
2 signals and the locking signal comprises the:

3 means for detecting a synchronization signal within said coded data
4 modulated signal;

5 means for synchronizing said receiver to said coded data
6 modulated signal; and

7 means for detecting the control signals indicative of a beginning of
8 said plurality of data blocks within said coded data modulated
9 signal.

1 52. An apparatus for receiving coded data modulated signal from a
2 transmission channel, said transmission channel characterized by multiple
3 transmission paths having variable transmission time and variable

4 attenuation characteristics causing multiple copies of said coded data
5 modulated signal, said apparatus for receiving the coded data modulated
6 signal executing a process comprising the steps of:

7 a) setting a priority value for each of a plurality of receiving
8 transducers, said plurality of receiving transducers in
9 communication with the transmission channel such that said
10 receiving transducers convert one of the copies of the coded
11 data modulated signal to a received electrical signal;

12 b) selecting one of the plurality of receiving transducers having a
13 highest priority;

14 c) evaluating signal characteristics of said received electrical signal
15 from the one receiving transducer having the highest priority;

16 d) extracting coded data, control signals, and locking signals from
17 the received electrical signal from the one receiving
18 transducer having the highest priority;

19 e) performing an error check and correction upon said coded data;

20 f) if the signal characteristics, control signals, locking signals, and
21 results of said error check and correction indicate that the
22 received electrical signal is not adequate for reconstruction
23 of coded data from said received electrical signal, adjusting

24 said priority value of said receiving transducer to a lower
25 priority; and

26 g) repeating steps d) through f) until said coded data is successfully
27 received.

1 53. The apparatus of claim 52 wherein the step of extracting the coded data
2 includes the step of rearranging the coded data such that data within said
3 coded data is in contiguous order.

1 54. The apparatus of claim 52 wherein extracting the control signals and the
2 locking signal comprises the steps of:

3 detecting a synchronization signal within said coded data
4 modulated signal;

5 synchronizing said receiver to said coded data modulated signal;
6 and

7 detecting the control signals indicative of a beginning of said
8 plurality of data blocks within said coded data modulated signal.